

Notice of Allowability

Application No.

10/755,395

Examiner

Stephen W. Smoot

Applicant(s)

SHIMIZU, MIKIO

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to application papers filed on 13 January 2004.
2. ☒ The allowed claim(s) is/are 1-17.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 1-13-04
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

Stephen W. Smoot

Stephen W. Smoot
Patent Examiner
Art Unit 2813

This Office action is in response to application papers filed on 13 January 2004.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below in order to change the title of the invention to one that is more descriptive of the applicant's claimed invention per MPEP section 606.01. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

2. The application has been amended as follows:

In the Title:

Change the title of the invention to

--Method of Manufacturing Semiconductor Device Using Thermal Treatment that Features Lower Speed Wafer Rotation at Low Temperatures and Higher Speed Wafer Rotation at High Temperatures--.

3. Claims 1-17 are allowed.

4. The following is an examiner's statement of reasons for allowance:

- Claims 1-7 are allowed because the prior art of record does not teach or suggest, in combination with the other claim limitations, a method of manufacturing a semiconductor device using a thermal treatment that includes rotating a wafer at a relatively low revolution speed when the temperature is controlled by an open loop process and rotating the wafer at a relatively high revolution speed when the temperature is controlled by a closed loop process, wherein the open loop control is made when the wafer temperature is relatively low in comparison to the wafer temperature during the closed loop control; and
- Claims 8-17 are allowed because the prior art of record does not teach or suggest, in combination with the other claim limitations, a method of manufacturing a semiconductor device using a thermal treatment that includes rotating a wafer at a relatively low revolution speed when the wafer temperature is 500 degrees C or lower and rotating the wafer at a relatively high revolution speed when the wafer temperature is higher than 500 degrees.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Thakur (US 5,654,904), Knoot, Aschner et al., Tam et al., and Mahawili teach rapid thermal processing methods and/or apparatus that includes wafer or substrate rotation. Thakur (US 6,528,364 B1) teaches a silicon nitride deposition method that includes reducing the rate of substrate rotation at the conclusion of the silicon nitride deposition. Suzuki et al. teach rapid thermal processing that includes open loop control below 500 degrees C and closed loop control above 500 degrees C.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen W. Smoot whose telephone number is 571-272-1698. The examiner can normally be reached on M-F (8:00 am to 4:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SWS